Mounting Procedure

It is essential that good mounting procedures be followed in order to obtain optimum tire performance and operating efficiency. Also, tire and rim servicing can be dangerous. To prevent serious injury, be sure you know, understand and follow all procedures and safety instructions.

Safety Instructions

Do not mount or demount tires without proper training. Wall charts containing mounting and demounting instructions for all on-highway rims should be available through your normal rim supplier. "Safety Precautions for Mounting and Demounting Tube Type Truck/Bus Tires" are also available through the United States Department of Transportation, National Highway Traffic Safety Administration, Washington, DC 20590. www.nhtsa.dot.gov

Wheel Inspection Guidelines

Remove any and all cracked wheels from service.

Cracked wheels not removed from service will fail.

Inspect wheels for sometimes small cracks emanating from stud holes.

These cracks will continue to grow outward, through the "dish" or between stud holes.

Inspect wheel mating surfaces for chaffing, corrosion or pitting.

Mating surfaces should be clean, smooth, and flush so as to permit uniform distribution of clamping and torquing forces.

Remove wheels from service with excessively worn mating surfaces and/or worn or "wallowed" stud holes.

Lubrication

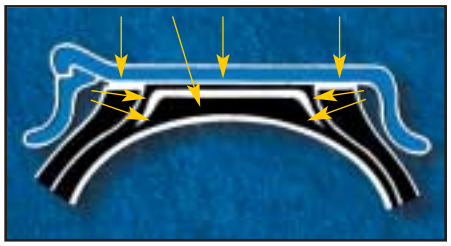

Figure 3.1 Lubricate areas shown by arrows

A non-water base commercial bead lubricant should be used since water in the tire can cause excessive rim corrosion problems. However, thin vegetable oil soap solutions with a water base are approved. Lubricants which contain a rust inhibitor can be an advantage. Avoid the use of excessive lubricant **Figure 3.1**.

Never use anti-freeze, silicones, or petroleum based lubricants.

Figure 3.2 Area of tube stretched thin due to improper lubrication and mounting.

When a tube and flap are not properly lubricated before mounting, they will be stretched thin in the tire bead and rim region **Figure 3.2**. This will cause premature failure.

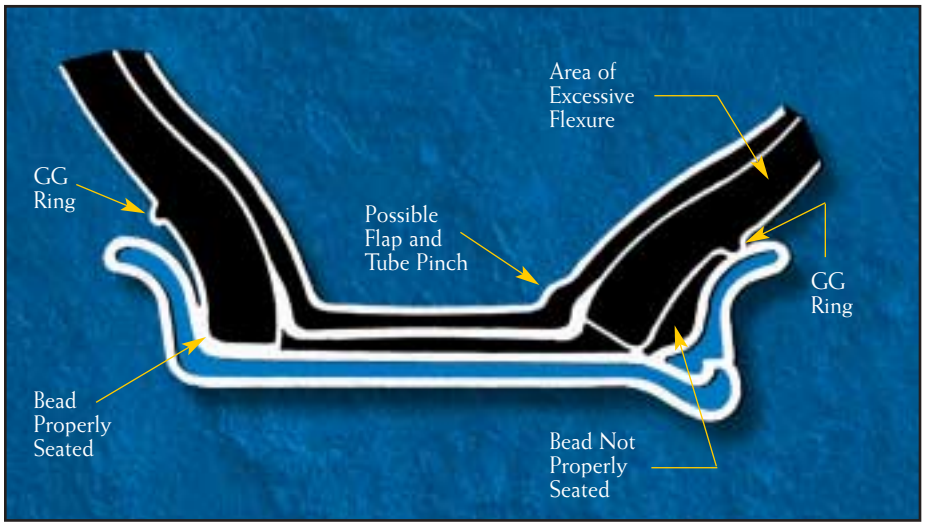

Figure 3.3 Improper bead seating

Always use lubricant when mounting radial truck tires to ensure proper bead seating and to prevent eccentric mounting. The more flexible sidewall of the radial tire makes the use of lubricant in the bead area more critical than for bias ply tires which have stiffer sidewalls. If the bead is not properly seated on either a 2-piece or 3-piece rim and becomes "hung-up," usually on the removable flange side of tube type tires, the lower sidewall area flexes excessively under load, and irregular treadwear and cracking in the lower sidewall bead area often result. Improperly seated beads can also produce severe truck vibration and cause chafing through the lower sidewall down to the wire.

When the bead is not properly seated, the bead toe is lifted, and the flap may be forced under the toe **Figure 3.3**. Continued up and down flexing of the toe can cut through the flap. As this process continues, the tube becomes pinched and may fail suddenly.

Tire & Rim Cleaning

To prepare the tire, first clean and dry the inside with an air hose. Inspect for loose material inside. A small piece of paper left inside a tube type tire can chafe a hole in the tube and cause a flat. Dust the inside of the tire sparingly with dry soapstone to prevent the tube from sticking to the tire. Do not let soapstone accumulate in the tire.

Also inspect and clean the tire beads to remove any accumulation of corrosion material or rubber that may be stuck to it. Wipe the beads with a dry cloth until clean.

Clean rims to remove dirt, surface rust, scale and rubber build up. Repaint to stop the detrimental effects of corrosion and facilitate checking and tire mounting. Be sure to clean the tire seat areas thoroughly to insure proper fitment of the tire and to eliminate the potential for air leaks in tubeless assemblies. Also file or use emery cloth to remove any burrs or nicks on the tire side of the rim. These may damage the tire during mounting or in service. Be very careful to clean all dirt and rust from the lock ring and gutter. This is important to secure the lock ring in its proper position. A filter on the air inflation equipment to remove moisture from the air line helps to prevent corrosion. Drain the air tank frequently. The filter should be checked periodically to see that it is working properly.

Check rim components periodically for cracks. Replace all cracked, badly worn, damaged and severely rusted components with new parts of correct size and type. When in doubt replace. Mark or tag the unusable parts as scrap and remove them from the service area.

Do not, under any circumstances, attempt to rework, weld, heat, or braze any rim components that are cracked, broken, or damaged. Replace them with new parts or parts that are not cracked, broken, or damaged and which are of the correct size and type.

Make sure matching parts are being assembled. Check DOT chart, your distributor or the manufacturer if you have any doubts.

Tubes & Flaps

Always install a new radial tube and a new radial flap in a new tire. Use only tubes designated for radials and make sure the proper size tube and flap is used. Never use undersized tubes. Certain precautions must be taken when mounting used flaps, or damage to the tire and tube will result.

New truck and bus flaps can be used with any one of several different tire and rim sizes as recommended. But, once used, the flap must be remounted in the same size tire and on the same size rim from which it was removed. Always use a flap of adequate width to prevent tube pinching.

As a precaution against flap failure, mark the tire and rim size on the flap at the time of removal (if inspection shows that it is not damaged and can be used again). When the flap is again mounted, this marking protects against the danger of misusing the flap with the wrong size tire and rim.

CAUTION

Used flaps cause tube failure unless mounted with the size tire and rim originally used.

The valve core provides a temporary air seal while air pressure checks are being made, but it will leak air slowly if the cap is loose, missing, or damaged. Use a sealing-type valve cap. A metal cap is preferred but a sealing-type nylon cap is acceptable.

In the case of used tires and tubes, recondition the valve stem every time a tire is mounted. Recondition the threads on both the inside and the outside of the stem with a valve stem rethreader tool. Install only new valve cores. Used or dirty valve cores may be defective. Don't take a chance. Valve cores must be stocked in clean closed containers at all times, since a small particle of dirt will render a core ineffective.

Assembly Of Tire Tube Flap

Insert the tube into the tire and partially inflate it to round out the tube. Apply rubber lubricant to the inside and outside surfaces of both beads and to the portion of the tube that appears between the beads. Do not allow lubricant to run down into the tire. Apply the lubricant with a cloth, swab, or brush.

For detailed, illustrated instructions on procedures and proper use of tire tools in mounting and demounting Goodyear radial truck tires on various types of rims, see the wall charts available through RMA (www.rma.org).

After mounting and before inflating the tire, inspect all components of multipiece rims to make sure they are in place. See that tires are properly mounted and seated on the rims by checking the distance between the tire GG ring and the rim flange. This distance should be the same all the way around the tire; that is, the rim flange must be concentric with the GG ring (refer to the photograph **Figure 3.4** below, and **Figure 3.3** on page 19, for GG ring location on tire) and the distance must be the same for both sides.

Figure 3.4 Use of GG ring to indicate correct mounting

WARNING

Always use a safety cage or approved safety device and extension hose with air gauge and clip-on air chuck for airing a tire on a multi-piece rim or single piece rim.

Tube type tires should always be aired once before the valve core is installed. This will eliminate confusion in inflating a tire twice. All tube type radial tires should be inflated twice.

To inflate twice, the tire is inflated to full inflation pressure, then all the air is let out and the tire is reinflated. The first inflation seats the bead of the tire, but over stretches the tube and flap in the area between the bead toes. Completely deflating the tire allows the tube and flap to relax. A partial deflation doesn't get the job done. The full deflation and reinflation stretches the tube and flap uniformly.

Important: During the first inflation, the airing should be stopped at about 10 psi, and the side ring or lock ring should be checked carefully to make sure it is properly seated. Also, it is recommended that the side ring or lock ring seating be checked at 10 psi during the second inflation.

WARNING

Never, under any circumstances, attempt to seat rim components by tapping with mallet when tire is inflated or partially inflated. *Deflate tire first.*

Install a sealing-type valve cap finger tight. A valve cap has two functions to perform. The first is to keep dirt from damaging the valve core sealing surface. The second, is to provide an air seal for

the valve. A valve cap, therefore, must be durable.

The black plastic cap that sometimes comes on a new tube is not a valve cap and will leak air at the high inflations used in truck tires. Its purpose is to keep dust and dirt out of the stem during shipment, protect the threads of the stem, and shield the folded tube against abrasion by the threads. The plastic cap threads are easily stripped; the plastic cap will crack in cold weather and will melt if the stem comes in contact with the brake drum. A metal valve cap contains a rubber gasket which provides an air seal; a plastic cap contains none. Therefore, always use a metal cap or a self-sealing nylon cap.

Valve extensions, or "air-through" valves are not a substitute for caps, since they are still subject to core seal leaks at high pressure. Valve extensions require a sealing-type valve cap.

Bend the valve stem to its proper position. If it is left flat and touching the rim, the valve cap will be difficult to remove and accurate air pressure checks will be hindered. (If it is easy to check the pressure in a tire, it is more likely to be checked.) The stem should not be bent up enough to cause it to touch the brake drum. Heat from the drum will be conducted along the brass valve stem to the tube/flap area around the stem base and cause decomposition of the rubber. This will lead to eventual tube failure. In such a heated valve stem, the valve core seal may also be ruined.

After the tire is mounted and inflated, the tire/wheel assembly should be put into stock for 24 hours to permit a test of its air retention. Just prior to being put in service, the pressure in the tire should be checked and compared with the initial value applied. If the pressure is more than 5 psi lower, the tire should be withheld from service and checked for a leak.

Tubeless Tire Mounting

For mounting tubeless tires, the procedure is about the same as for tube type tires except that it is not necessary to inflate twice. Cleaning the rim is again critical because the tire depends on the rim for its air seal. Make sure the inside of the tire is clean and dry. If tires have been stored outdoors, any water in the tire must be removed and the tire dried before mounting. Water vapor in the inflation air tends to cause rim corrosion. The valve stem must be inspected to make sure it is tight in the rim and that the rubber grommet between the rim and stem is in good condition.

To install the tubeless tire on the rim, lubricate both bead seats of the rim and both tire beads to ensure damage-free and uniform mounting. Bead lubricant must also be used during demounting to avoid damage to the bead area. Due to their greater sidewall flexibility, it may be necessary to use an inflation aid to help seat radial tubeless tire beads. For detailed mounting and demounting instructions, refer to the wall charts available through OSHA Occupational Safeaty and Health Administration (www.osha.gov). When using tire irons, exercise caution to prevent damage to the tire or rim.

Check that the distance between the tire GG ring and the top of the rim or wheel flange is uniform all around the tire, and that the distance is the same on both sides of the tire. If this distance is not uniform, the bead is not properly seated.

If the GG ring in no concentric with the rim flange, it is recommended that the "inflate-twice" procedure also be used in mounting tubeless tires in order to seat beads properly.

⚠ WARNING

Always use a securely held safety cage and extension hose with clip on air chuck for airing the tire. Rapid air loss can propel the assembly.

Installation

Installation of the tire on the vehicle is the final step. When pulling a tire from stock, check the air pressure against the desired value. When tires are to be mounted as duals, make sure that the two tires are actually the same size. (See Matching of Duals on page 25.)

Measure the outside diameter of every tire after it is mounted and inflated and before it goes into stock. The diameter should be written on the tread so that it is visible when the tire is in the spares rack. Then by simply looking at the treads of the spares in stock, a replacement tire of the correct diameter to match an already mounted dual can be selected.

There are many ways of measuring the size of a tire, but two ways appear to be more satisfactory than the others. Both involve measuring the complete circumference of the tire. The first uses a 14-foot endless steel mating tape. This is a steel band that is formed into a hoop. The hoop is slipped over the tire, pulled up tight, and a reading made. The second type is a pocket-size steel tape. With this it is necessary to hook the end in the tread and roll the tire one revolution, which brings the tape end back around and permits a reading of the circumference.

Another way of measuring tires uses calipers that measure tire diameter. The tape method is preferred because it provides an average diameter rather than any one particular diameter measurement.

Figure 3.5 Measuring with pocket size steel tape.

On demountable rims, lugs should be tightened uniformly in a triangulated or criss-cross sequence to achieve trueness of the rim on the wheel. Lug nuts should be torqued properly so they do not loosen in use. On disc wheels, stud nuts should also be drawn up and tightened in a criss-cross sequence. See rim and wheel manuals for more installation details. Lug or stud nuts should be checked for tightness after the first 100 miles of travel and once each week thereafter.

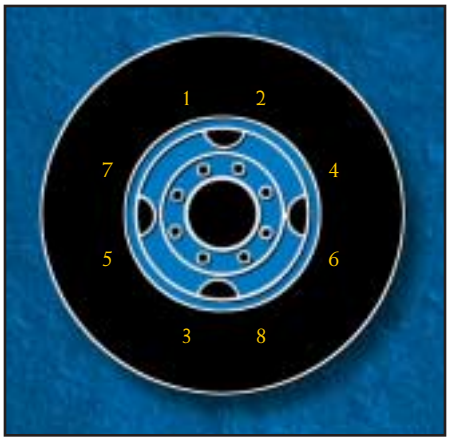

Figure 3.6 Proper sequence for tightening stud nuts on an 8 stud system.

Figure 3.7 Proper sequence for tightening stud nuts on an 5 and 6 stud systems.

Figure 3.8 Proper sequence for tightening stud nuts on 10 stud system.

DEMOUNTING

Always deflate any tire to be removed prior to loosening rim or wheel nuts. Bead lubricant must be used when demounting tubeless tires.

Matching Of Duals

Mismatched duals have the same effect on the life of tires as low inflation or overload. An underinflated tire on a dual assembly shifts its share of the load to its mate, which then becomes overloaded and frequently fails prematurely. A difference of 15 psi inflation may result in the lesser inflated tire supporting 500 pounds less than the tire with the proper inflation. A similar action occurs when one tire's diameter is smaller than its mate. A difference of 1/4 inch in diameter may result in the larger tire carrying 600 pounds more than the smaller. The shift in load becomes more prevalent as the difference in diameters or inflation becomes greater.

Improperly matched duals are subject to rapid treadwear because the larger tire carries more load and will wear fast . Although the mismatched duals have different diameters, they must rotate at the same speed. The smaller tire then also wears unevenly because it is forced to scuff over the road. The overall result is abnormal and unequal treadwear for both tires.

Improperly matched duals may also lead to sudden air loss as a result of one tire being required to flex severely in doing more than its share of the work.

In addition to matching diameters and inflation pressures on dual installations, it is very important not to mix radials and bias ply tires on the same axle due to different load/deflection characteristics of these two types of tires. Radial tires deflect more under a given load than bias ply tires. If radial and bias ply tires are mixed in dual installations on the same axle, the bias ply tires will bear the greater part of the axle load and may operate in an overloaded condition that will lead to reduced mileage and early failure.

Radial tire overall diameter will govern the revolutions per mile obtained from a given tire. It is necessary to closely match tire revolutions per mile with tandem drive axle units coupled directly together, as when an interaxle differential does not exist or is locked out. Otherwise, the drive transmission may freeze up or fail in some way, and/or excessive slip on one of the sets of tires will lead to a loss in traction and uneven wear.

It is important that the tires of tandem driving axles be inspected and matched at regular periods, as determined by the type of service.

Matching dual tires is important to insure even wear and load sharing capabilities. Tire circumference of duals should be as close as possible with a maximum tire circumference tolerance of 3/4" for tire sizes 8.25R20 and 1-1/2" maximum circumference tolerance for tire sizes 9.00R20 and larger.

When mounting duals on a truck, there will generally be some difference in the diameter of the two tires (within the limits described above). Mount the small tire on the inside. The outside tire wears faster than the inside tire. As it wears its diameter will approach that of the inside tire. Additionally, any crown on the road will favor the placement of the smaller diameter tire on the inside.

At the time of mounting duals on a vehicle, locate the two valves diametrically opposite (180 degrees apart) for accessibility. Hand holes on disc wheels must be located so that the inside valve is accessible.

Spacing Of Duals

Proper spacing between dual tires is important. Too often, the service rendered by dual tires is sharply reduced because of insufficient spacing. It is a condition caused by either (a) oversized tires or (b) improper rims and wheels. Tires mounted too close together do not allow proper air circulation to dissipate tire heat. Heat increases tire tread loss rate and reduces tire durability. When a truck is heavily overloaded, insufficient spacing can cause the sidewalls of the duals to rub together, wear off rubber, and become overheated due to continuous friction.

If the space between duals is too great, there will be excessive dragging and scuffing of the outside tire each time a turn is made. Also, check overall vehicle track width to assure compliance with width laws.

Note that proper dual spacing for radial tires is the same as for bias ply.

An understanding of the geometry of a dual tire installation is important. A cross-section through a typical dual installation is shown in **Figure 3.9**. The dual spacing of the installation is the sum of the rim offsets and the spacer width.

To determine tire clearance, subtract the section width from the figure for dual spacing. Use the loaded section width (LS) at rated load for a more exact clearance figure. The loaded section width can be found in the Goodyear Truck Tire Engineering Data Book, or the width of a tire can be measured under load.

Dual spacing and tire clearance can be varied by changing spacer width. To increase spacer width, however, the mounting width on the dual wheel must be great enough to accommodate a wider spacer. The distance from the outside tire wall of one dual assembly to the outside tire wall of the assembly on the other side of the truck will be made greater when spacer width is increased. If this distance is the maximum width of the vehicle, state laws governing truck width must be considered.

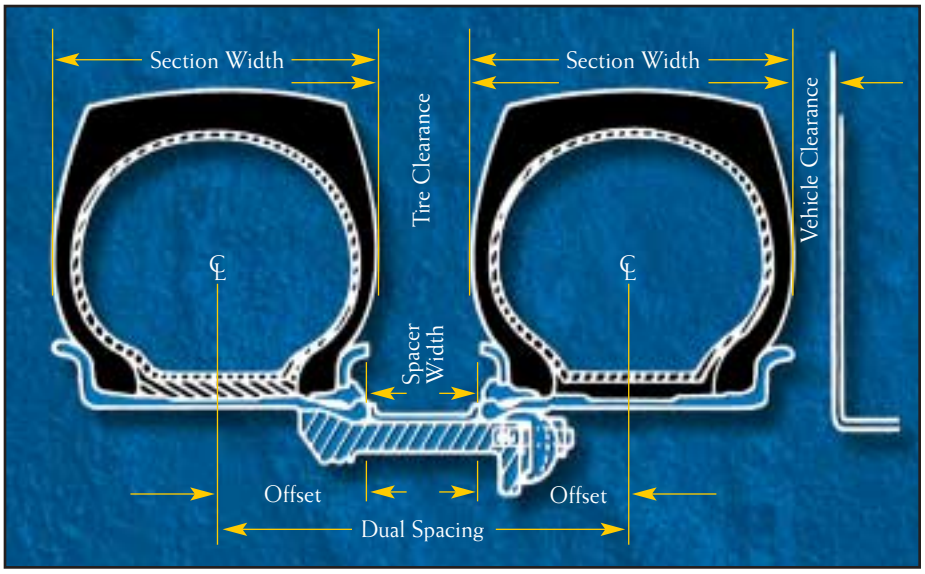

Figure 3.9 Cross-section through typical dual installation

Rim offset determines dual spacing and affects vehicle clearance and possibly overall vehicle width. Any change in offset of the inside rim will change vehicle clearance proportionally. Any offset changes of the outside rims will change the overall distance across the vehicle from outside tire wall to outside tire wall.

Both load and inflation must be considered in selecting rim size or type. Consult rim manufacturer for recommended rim style for extra ply rating tires.

Spacers

Spacer installation procedure is as follows:

1. Examine spacer brand to be sure it is not damaged, bent, or distorted. It should be perfectly circular.
2. Do not roll vehicle, wheels, axle, or assemblies on spacers.
3. Position inside rim over cast spoke wheel as close as possible to the mounting level.
4. Push spacer band over cast spoke wheel with consistent pressure on both sides. Avoid cocking band. Achieve snug fit against spokes and inside rim gutter edge.
5. Turn spacer band on wheel to check concentricity.
6. Position outside rim, install outer rim clamps and tighten nuts evenly. Tighten nuts gradually in a criss-cross sequence across the diameter of the wheels. Consult rim manufacturer's recommendations for proper torque range.
7. Examine clamps to be sure they have not bottomed out. Check rim edges to be sure they consistently meet the spacer band edges.
8. After road service, recheck torque.

Proper Matching Of Rim Parts

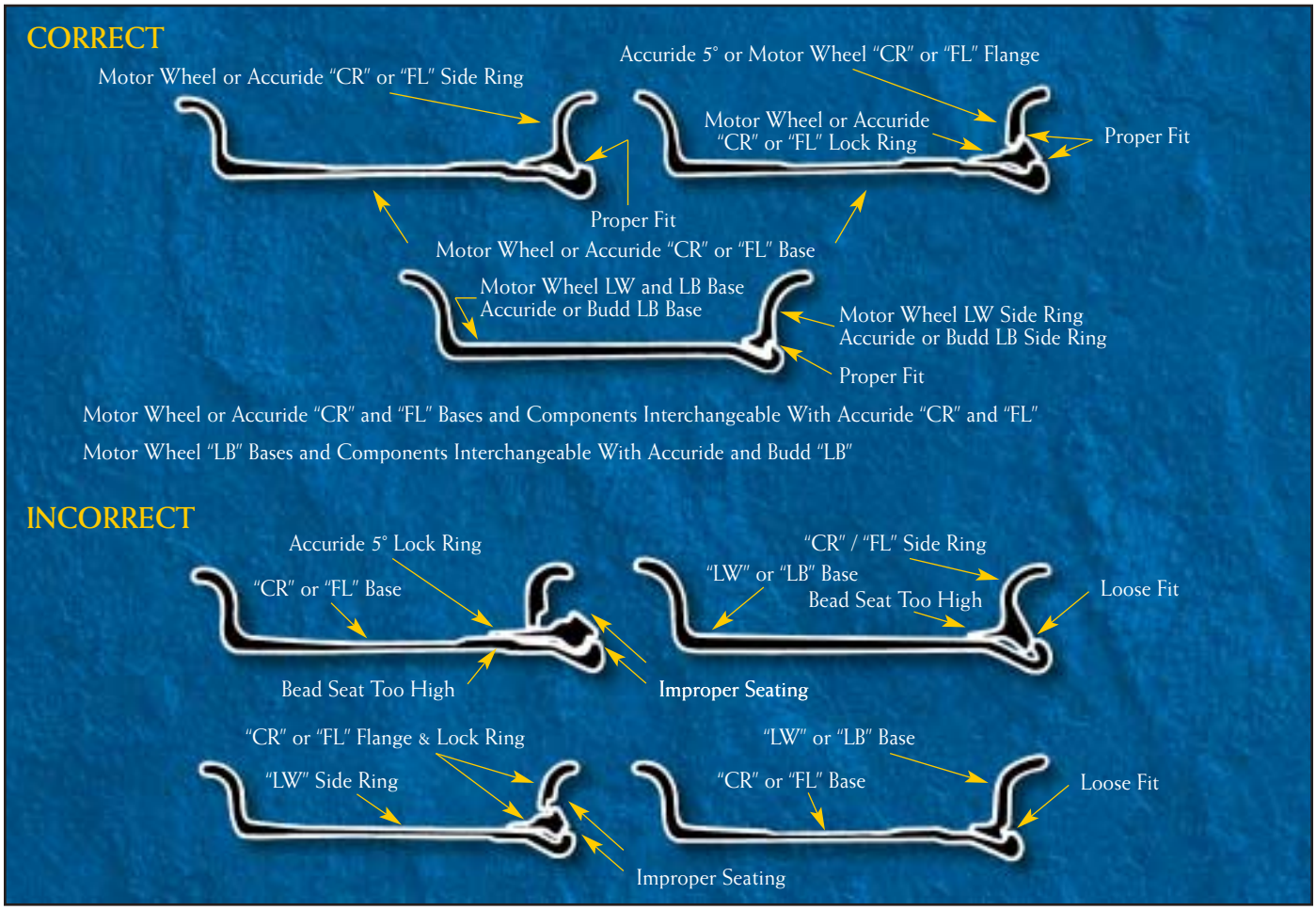
CORRECT
Motor Wheel or Accuride "CR" or "FL" Side Ring
Accuride 5° or Motor Wheel "CR" or "FL" Flange
Motor Wheel or Accuride "CR" or "FL" Lock Ring
Proper Fit
Proper Fit
Motor Wheel or Accuride "CR" or "FL" Base
Motor Wheel LW and LB Base
Accuride or Budd LB Base
Motor Wheel LW Side Ring
Accuride or Budd LB Side Ring
Proper Fit
Motor Wheel or Accuride "CR" and "FL" Bases and Components Interchangeable With Accuride "CR" and "FL"
Motor Wheel "LB" Bases and Components Interchangeable With Accuride and Budd "LB"
INCORRECT
Accuride 5° Lock Ring
"CR" or "FL" Base
Bead Seat Too High
"CR" / "FL" Side Ring
"LW" or "LB" Base
Bead Seat Too High
Loose Fit
Improper Seating
"CR" or "FL" Flange & Lock Ring
"LW" Side Ring
"LW" or "LB" Base
"CR" or "FL" Base
Loose Fit
Improper Seating

Figure 3.10 Correct and incorrect matching of rim parts

Most highway rims look alike, but all vary somewhat in certain construction features. Variances between rims of different types make part mixing hazardous. A close, proper fit between rim parts is essential to long tire life as well as operating safety. Although side rings, flanges, and lock rings of different types appear to be properly seated, difficult to detect gaps are often present.

The illustrations in **Figure 3.10** show correct, safe matchings of rim parts. Mismatched rings and bases, which almost always create an unsafe operating condition are also shown. For more information, refer to Department of Transportation (DOT) Multipiece Rim/Wheel Matching Chart. (www.dot.gov)

In addition to the safety problems posed by mismatched rings and bases, mismatched components can cause special problems in tire, flap, and tube wear.

Mismatched rim components that result in a high bead seat often achieve bead seating over only a portion of the rim circumference. This causes:

- Vibration
- Uneven wear
- Severe rim chafing at top of flange
- Larger gaps in two piece rim flanges which cut chafer
- Torn chafers at bead heel
- Cut bead heels, which generally identify this condition
- Bead base irregular chafing
- Lower sidewall separation due to stress concentration at flange top
- Broken beads

Mismatched assemblies that result in a low bead seat can sometimes be recognized by rust on the bead face. Such assemblies allow:

- Irregular bead base wear
- Off-center mounting, higher imbalance, more vibration
- Rotational slippage of tire on rim
- Valve stem tear-outs

Rim component mismatch — with either high or low bead seat diameter — permits bead rocking which can cause the tire bead toe to cut through the flap and tube. This additional bead movement can also cause the flap edge to cut through the tube. In either case, a flat tire is the eventual result.

SAFETY PRECAUTIONS

Inspection: Precautions And Reasons For Precautions

- Clean rims and repaint to stop detrimental effects of corrosion and facilitate checking and tire mounting. Be very careful to clean all dirt and rust from the lock ring and gutter. This is important to insure that the lock ring seats in its proper position. A filter on the air inflation equipment to remove the moisture from the air line helps prevent corrosion. The filter should be checked periodically to see that it is working properly.

  Parts must be clean for a proper fit — particularly the gutter section which holds the lock ring in proper position.
- Components that are cracked, badly worn, damaged, bent, repaired, or pitted from corrosion must not be used and must be discarded. When component condition is in doubt, replace.

  Parts that are cracked, damaged or excessively corroded are weakened.
- Do not, under any circumstances, attempt to rework, weld, heat, or braze any rim components that are cracked, broken, or damaged. Replace with new parts or parts that are not cracked, broken, or damaged and which are of the same size and type and are compatible with the other parts.

  Heating may weaken a part to the extent it is unable to withstand forces of inflation or operation.
- Make sure correct parts are being assembled. Check your distributor or the manufacturer if you have any doubts.

  Mismatched parts may appear to fit, but when the tire is inflated may fly apart with explosive force sufficient to cause serious injury or death.
- Don't be careless or take chances. If you are not sure about the proper mating of rim and wheel parts, consult a rim and wheel expert. This may be the tire man who is servicing your fleet, the rim and wheel distributor in your area, or the manufacturer's sales engineer.

  Failure to exercise proper care can result in serious physical injury or death.
- Don't reinflate a tire that has been run flat or has been run at 80 percent or less of its recommended operating pressure, or when there is obvious or suspected damage to the tire or wheel components.

  Components may have been damaged or dislocated during the time the tire was run flat or seriously underinflated.

MOUNTING AND INFLATION:
Precautions For Potential Steel Cord Fatigue Damage

Underinflated truck tires can be subject to cord fatigue in the upper sidewall area caused by over-flexing of the tire. This cord fatigue leads to a loss of strength of the ply cords. When a tire loses air and is continued in service without remedial action, it may sustain internal damage that could lead to failure upon reinflation or subsequent service. When such a tire is reinflated, or removed from the rim (for example, for tire repair or maintenance) and then remounted, inflation used to bring the tire to its operating pressure may cause one or more of the weakened cords to break. This cord failure causes an increase in tension on cords adjacent to the broken cord, with the result that more of the weakened cords may fail. This breakage may continue until a rupture occurs in this area of the tire with accompanying air loss, which is commonly referred to as a Zipper Rupture.

Permanent tire damage due to underinflated operation cannot always be detected. Any tire known or suspected to have run at 80% or less of normal operating inflation pressure could possibly have permanent structural damage and should be treated as having been operated flat or underinflated. The tire should be demounted using proper precautions and should not be reinflated until the tire is carefully inspected by a trained technician for determination of the cause of the inflation loss, and any possible strucural. damage. (See pages 29 - 31)

GOODYEAR STRONGLY RECOMMENDS THAT:

- Truck tires should be visually inspected daily for cuts, snags, penetrations or puncturing objects.
- Proper tire inflation be maintained.
- Highway truck tire inflations be checked at least weekly, or more frequently if operating conditions dictate, using an accurate calibrated air gauge.
- Any tires suspected to have been operated underinflated must be clearly marked and segregated, so as to prevent their accidental use prior to being thoroughly inspected by a trained tire technician.
- Tires that show discoloration and wrinkling of the innerliner, and/or weakness and distortion of the upper sidewall (indications of damage due to underinflation) are to be scrapped.
- After servicing the tire, inflate it to 20 psi OVER recommended operating pressure in an APPROVED SAFETY CAGE USING A CLIP-ON CHUCK, EXTENSION HOSE AND PRESSURE REGULATOR. Allow the tire to remain overinflated for 20 minutes and then deflate to the recommended operating pressure BEFORE removing from the safety cage.
- Goodyear's long-standing policy and Occupational Safety and Health Administration (www.osha.org) Standard 1910.177, require that all tubeless and tube type truck tires be inflated in an OSHA approved inflation safety cage in conjunction with the use of an extension air hose equipped with a clip-on air chuck.
- While this OSHA standard pertains to medium truck tires, Goodyear strongly recommends these procedures be used for all LIGHT TRUCK tires also.

UNLESS THE PRECAUTIONS NOTED ABOVE ARE CAREFULLY AND COMPLETELY FOLLOWED, SUCH FAILURE MAY CAUSE SERIOUS PERSONAL INJURY OR DEATH.

MOUNTING AND INFLATION:
Precautions And Reasons For Precautions

- Always match a tire (size) diameter designation with exactly the same rim diameter designation. Don't assume that it came in with proper size.
- Rims of different diameters and tapers cannot be interchanged.
- Don't try to seat rings or other components by hammering while tire is inflated or partially inflated.
- Never introduce a flammable substance into a tire — before, during or after mounting.

  Doing so is unsafe and may result in internal tire damage or fire, rim damage or a potentially dangerous vapor remaining in the tire. Any of these conditions could cause serious personal injury during the mounting and inflating procedure.
- Double check to make sure all components are properly seated prior to and after inflation.
- Always inflate in a safety cage or use another restraining device that is approved by the Occupational Safety and Health Administration (www.osha.gov).
- Don't inflate a tire before all components are properly in place. Place assembly in a safety cage or use another restraining device and inflate to approximately 10 psi. Recheck components for proper assembly. Observe that the O-ring does not roll out of its groove. If the assembly is not proper, deflate and correct. Never hammer on an inflated or partially inflated tire/rim assembly. If the assembly is proper at approximately 10 psi, continue to inflate to fully seat the tire beads.

  If tube type, inflate tire to approximately 75 psi pressure (Grader, 50 psi). Then completely deflate to remove buckles and uneven stresses from the tube and flap before reinflating to correct operating pressure. This repeat inflation is necessary to prevent buckles which may lead to premature tube failures.

  After completing inflation, check valve and rim components in both bead areas for leaks. Observe tire lower sidewall circumferential groove's concentricity with top of flange. If the distance between the groove and rim flange varies by 1/8" or more around the circumference or from one bead to the other, the tire beads must be unseated from the bead seat, relubricated and reseated.
- Never sit on or stand in front of, or over, a tire and rim assembly that is being inflated. During inflation, always use a clip-on chuck with sufficient length of hose to permit standing clear of the potential trajectory of the wheel components, and use an in-line valve with gauge or a pressure regulator preset to a desired value when inflating a tire. When a tire is in a restraining device, do not lean any part of your body or equipment on or against the restraining device.

  If parts are improperly installed they may fly apart with explosive force sufficient to cause serious injury or death. Rapid air loss can propel an assembly.
- Follow recommended mounting, demounting, inflating and deflating procedures for tires and rims as outlined in this manual.

  Misassembled parts may fly apart during inflation: check at 10 psi to determine whether parts are in proper position.
- Don't hammer on rims or components with steel hammers. Use rubber, lead, plastic or brass faced mallets if it is necessary to tap uninflated components together. Mallet faces should be in good condition to avoid chips from mallet face inside of the components.

  Properly matched and assembled components will seat without tapping. If a part is tapped, it or the tapping tool may fly out with explosive force.
- When moving a tire or wheel with a cable or chain sling, stand clear.

  The cable or chain may break, lash out and cause serious injury.
- Never attempt to weld on an inflated tire/rim assembly or on a rim assembly with a deflated tire.

  Heat from welding will cause a sudden, drastic increase in pressure, often resulting in a large, explosive force. Deflated tires can catch fire inside the air chamber.
- Mixing parts of one type rim with those of another is extremely dangerous. Always check manufacturer for approval if in doubt.

OPERATION: Precautions And Reasons For Precautions

- Always use rims recommended for the tire. Consult catalogues for proper tire/rim matching.
- Don't overload or overinflate tire/rim assemblies. Check for adequate rim strength if special operating conditions are anticipated.

  Excessive overload or overinflation can cause damage to the tire and rim assembly.
- Never run a vehicle on one tire of a dual assembly.

  The carrying capacity of the single tire and rim is dangerously exceeded, and operating a vehicle in this manner can result in damage to the rim and tire or cause a tire fire.
- Never use a tube in a tubeless tire/rim assembly where the rim is suspected of leaking.

  Loss of air pressure through fatigue cracks or other fractures in a tubeless rim warns you of a potential rim failure. This safety feature is lost when tubes are used with leaking rims. Continued use may cause the rim to burst with explosive force.
- Always inspect rims and wheels for damage during tire checks.

  Early detection of potential rim failures may prevent serious injury.
- Never add or remove an attachment or otherwise modify a rim (especially by heating, welding or brazing) unless the tire has been removed and approval has been received from the rim manufacturer.

  Modification or heating of a rim or one of its parts may weaken it so that it cannot withstand forces created by inflation or operation.

SERVICING TIRE AND RIM ON VEHICLE: Precautions And Reasons For Precautions

- Block the tire and wheel on the opposite side of the vehicle before placing the jack in position.
- Regardless of how hard or firm the ground appears, put hardwood blocks under the jack. Always provide for vehicle support with blocks just in case the jack should slip.

  The vehicle may shift, slip off the jack and cause injury.

Inspection Procedures For Identification Of Potential "Zipper Ruptures" In Steel Cord Radial Medium And Light Truck Tires

Any tire suspected of having been operated underinflated and/or overloaded must be approached with caution. Completely deflate the tire by removing the valve core before removing the tire/rim/wheel assembly from the vehicle. After removing from the vehicle, clearly identify the tire, so it will not be reinflated **until carefully inspected by a trained technician**, to determine the cause of inflation loss, as well as any tire damage resulting from underinflation and/or overloading.

⚠WARNING

Permanent tire damage due to underinflation and/or overloading cannot always be detected. Any tire known or suspected to have been run at 80% or less of normal operating inflation pressure and/or overloaded, could possibly have permanent structural damage (steel cord fatigue). Ply cords weakened by underinflation and/or overloading may break one after another, until a rupture occurs in the upper sidewall with accompanying instantaneous air loss and large explosive force. This can result in serious injury or death.

Inspection Procedures For Tires Suspected Of Having Been Run Underinflated And/Or Overloaded

A Inspect Deflated Suspect Tires Mounted on the Rim –

LOOK for:

cuts, snags, or chips exposing body cords or steel*; distortions or undulations (ripples and/or bulges), using an indirect light source, which will produce shadows left by any sidewall irregularities.

FEEL for:

soft spots in the sidewall flex area; distortions or undulations (ripple and/or bulges); protruding filaments indicating broken cords; and

LISTEN for:

any popping sound when feeling for soft spots or when rolling the tire.

If any of these conditions are present, the tire should be made unusable and scrapped. *If no other condition is present and a tire contains cuts, snags, or chips exposing body cords or steel, it must be referred to a full-service repair facility, to determine if it is repairable and not a source of a potential zipper.

If none of these conditions are present, place the tire/rim/wheel assembly in an approved inflation safety cage. REMAIN OUTSIDE OF THE TIRE'S TRAJECTORY. DO NOT PLACE HANDS IN SAFETY CAGE WHILE INSPECTING TIRE, OR PLACE HEAD CLOSE TO SAFETY CAGE. With the valve core removed, reinflate the tire to 20 psi, using a clip-on air chuck with a pressure regulator and an extension air hose.

B Inspect Suspect Tire Inflated to 20 psi —

LOOK for:

distortions or undulations (ripples and/or bulges); and

LISTEN for:

any popping sound.

If any of these conditions are present, the tire should be made unusable and scrapped.

If none of these conditions are present, dismount the tire to visually and manually inspect it, both inside and outside.

C Inspect Suspect Tires after Dismounting —

LOOK for:

bead rubber torn to the fabric or steel*; cuts, snags, or chips exposing body cords or steel*; distortions or undulations (ripples and/or bulges), using an indirect light source, which will produce shadows left by any sidewall irregularities; creasing, wrinkling, cracking or possible discoloration of the innerliner; and any other signs of weakness in the upper sidewall.

If any of these conditions are present, the tire should be made unusable and scrapped. *If no other condition is present and a tire contains cuts, snags, or chips exposing body cords or steel, it must be referred to a full-service repair facility, to determine if it is repairable and not a source of a potential zipper.

If none of these conditions are present, the tire may be returned to service, using the procedures on the next page.

⚠ WARNING

STAY OUT OF TRAJECTORY AS INDICATED BY SHADED AREA.

Note: Under some circumstances, the trajectory may deviate from its expected path. Always deflate tires before handling. Inflate only in safety cage.

Inspection Procedures For All Tires Returning to Service (Including used, retreaded, or repaired, regardless of being suspect or not suspect)

A Inspect Dismounted Tires (including used, retreaded, or repaired)–

LOOK for:

bead rubber torn to the fabric or steel*; cuts, snags or chips exposing body cords or steel*; distortions or undulations (ripples and/or bulges), using an indirect light source, which will produce shadows left by any sidewall irregularities; creasing, wrinkling, cracking, or discoloration of the innerliner; any other signs of weakness in the upper sidewall;

FEEL for:

soft spots in the sidewall flex area; distortions or undulations (ripples and/or bulges); protruding filaments indicating broken cords; and

LISTEN for:

any popping sound when feeling for soft spots or when rolling the tire.

If any of these conditions are present, the tire should be made unusable and scrapped. *If no other condition is present and a tire contains tears, cuts, snags, or chips exposing body cords or steel, it must be referred to a full-service repair facility, to determine if it is repairable and not a source of a potential zipper.

If none of these conditions are present, place the tire/rim/wheel assembly in an approved inflation safety cage. REMAIN OUTSIDE OF THE TIRE'S TRAJECTORY. DO NOT PLACE HANDS IN SAFETY CAGE WHILE INSPECTING TIRE, OR PLACE HEAD CLOSE TO SAFETY CAGE. After properly seating the beads, with the valve core removed, adjust the tire to 20 psi, using a clip-on air chuck with a pressure regulator and an extension air hose.

B Inspect Mounted Tires Inflated to 20 psi —

LOOK for:

distortions or undulations (ripples and/or bulges); and

LISTEN for:

any popping sound.

If any of these conditions are present, the tire should be made unusable and scrapped.

If none of these conditions are present, with valve core still removed, inflate the tire to 20 psi OVER the recommended operating pressure. During this step, if *any* of the above conditions appear, **immediately stop inflation.**

C Inspect Mounted Tires Inflated 20 psi OVER Operating Pressure —

LOOK for:

distortions or undulations (ripples and/or bulges): and

LISTEN for:

any popping sound.

Any tire suspected of having been underinflated and/or overloaded *must* remain in the safety cage at 20 psi OVER operating pressure for 20 minutes.

If any of these conditions are present, the tire should be made unusable and scrapped.

If none of these conditions are present, BEFORE removing the tire/rim/wheel assembly from the safety cage, reduce the inflation pressure to the recommended operating pressure. REMAIN OUTSIDE OF THE TIRE'S TRAJECTORY.

Occupational Safety and Health Administration Standard 1910.177 requires all tubeless and tube-type medium and large truck tires be inflated using an OSHA-approved restraining device (e.g. safety cage) or barrier, and using a clip-on air chuck with a pressure regulator and an extension air hose. While the OSHA (www.osha.gov) standard pertains to medium and large truck tires, RMA also strongly recommends these procedures be used for all LIGHT TRUCK TIRES.

⚠WARNING

Mounting Tires Is Dangerous - failure to follow the above and Rubber Manufacturer's Association (RMA) "Demounting and Mounting Procedures for Truck/Bus Tires" or "Demounting and Mounting Procedures for Automobiles and Light Truck Tires" charts and safety precautions can result in serious injury or death. For more information visit www.rma.org.